

State of California
AIR RESOURCES BOARD

Small Off Road Engine Evaporative Emission System Components

Q-08-012
Arkema Inc.
Innovative Product

WHEREAS, Pursuant to California Health and Safety Code, sections 39600, 39601 and 43013, the California Air Resources Board (ARB) has established a certification process for evaporative emission system components designed to control gasoline emissions from small off-road engines, as described in title 13, California Code of Regulations (13 CCR), section 2767.1;

WHEREAS, Pursuant to California Health and Safety Code, section 43013, ARB has established criteria and test procedures for determining the compliance of evaporative emission system components with the design requirements in 13 CCR, section 2754;

WHEREAS, Pursuant to 13 CCR, section 2767.1, ARB Executive Officer may issue an Executive Order if he determines that the small off-road engine evaporative emission system component or innovative product conforms to the applicable performance requirements set forth in 13 CCR, section 2754 and 2755;

WHEREAS, Pursuant to Health and Safety Code, sections 39515 and 39516, ARB Executive Officer issued Executive Order G-05-008 delegating to the Chief of ARB Monitoring and Laboratory Division (MLD) the authority to certify small off-road engine evaporative system components and innovative products;

WHEREAS, On March 11, 2008, Arkema Inc. submitted an application for certification as an innovative product under 13 CCR, section 2767(c) for "One Shot" PetroSeal™ technology rotomolded fuel tanks; and

NOW, THEREFORE, I, William V. Loscutoff, Chief of MLD, find that fuel tanks using Arkema Inc. "One Shot" PetroSeal™ technology produced following the process and material specifications set out in Attachment A constitute an innovative fuel tank pursuant to 13 CCR, section 2767(c). Fuel tanks produced following Arkema Inc.'s process and material specifications are hereby deemed equivalent to those tanks listed in 13 CCR, section 2752(a)(5). This finding is based on Arkema Inc.'s demonstration that such tanks have a permeation rate substantially lower than 1.5 grams per square meter per day set forth in 13 CCR, section 2754, when tested at a constant temperature of 40° C pursuant to TP-901 using an approved test fuel of California Phase II Certification Fuel.

IT IS ORDERED AND RESOLVED that no tank permeation data is required to be submitted in the certification process for equipment using the Arkema Inc. "One Shot" PetroSeal™ technology rotomolded fuel tank.

IT IS ORDERED AND RESOLVED that all fuel tanks made from Arkema Inc. "One Shot" PetroSeal™ technology with average barrier and wall thicknesses equal to or greater than the value listed in Table 1 attached hereto and incorporated herein, are certified for use in small off-road equipment.

Table 1
Specifications for Arkema Inc. "One Shot" PetroSeal™ Fuel Tanks

Min. average barrier thickness (mm)	Min. average overall tank thickness (mm)
1	4

IT IS FURTHER ORDERED that Arkema Inc. shall provide a warranty to equipment manufacturers purchasing their "One Shot" PetroSeal™ technology rotomolded fuel tanks. The warranty must conform to the requirements of 13 CCR, section 2760.

IT IS FURTHER ORDERED that the certified "One Shot" PetroSeal™ technology rotomolded tanks shall be installed in accordance with the manufacturer's installation and use instructions for the tank. A copy of this Executive Order, fuel tank installation, and use instructions shall be provided to manufacturers purchasing Arkema Inc. "One Shot" PetroSeal™ technology rotomolded fuel tanks for installation on small off-road engines and equipment introduced into commerce in California.

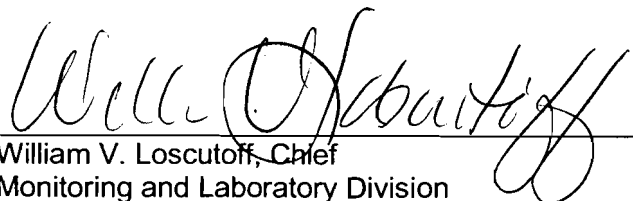
IT IS FURTHER ORDERED that Arkema Inc. "One Shot" PetroSeal™ technology rotomolded fuel tanks shall be clearly identified by a permanent identification that allows ARB to identify manufacturer's name, executive order number, and model number.

IT IS FURTHER ORDERED that any modification of Arkema Inc.'s approved process and material specifications for producing a "One Shot" PetroSeal™ technology rotomolded fuel tank are prohibited. Any alteration or modification of the process or material specifications set out in Attachment A of this Executive Order will require the manufacturer to apply for a new Executive Order.

IT IS FURTHER ORDERED that the Arkema Inc. "One Shot" PetroSeal™ technology rotomolded fuel tank shall be compatible with fuels in common use in California at the time of certification and any modifications to comply with future California fuel requirements shall be approved in writing by the Executive Officer or Executive Officer's delegate.

IT IS FURTHER ORDERED that the innovative product certification of the Arkema Inc. "One Shot" PetroSeal™ technology rotomolded fuel tank can be referenced in certification applications for small off-road engines and equipment that use small off-road engines unless the Executive Officer finds that the Arkema Inc. "One Shot" PetroSeal™ technology rotomolded fuel tank no longer meet the performance requirements set forth in 13 CCR, section 2754 when tested pursuant to 13 CCR, section 2765.

Executed at Sacramento, California, this 4th day of April 2008.


William V. Loscutoff, Chief
Monitoring and Laboratory Division

Attachment A

ARB Executive Order for Arkema "One Shot" PetroSeal™

1.0 Materials Designations:

The Arkema materials used for purposes of producing the PetroSeal™ two layer rotationally molded fuel tanks are:

- 1.1 Arkema RILSAN® ROTO 11 NATURAL or RILSAN® ROTO 11 BLACK as the inner layer.
- 1.2 Arkema PetroSeal™ Polyethylene used in the outer layer. This material is manufactured by and commercially available from Total Petrochemicals under the tradename Total Petrochemicals mPE M 3670.
- 1.3 Pebax® 5533 Polyether Block Amide films made into packets or sachets, completely melt sealed to contain the necessary quantities of RILSAN® ROTO 11 required to deliver nominal 1 mm thickness of RILSAN® ROTO 11.

2.0 Tank Design Features:

2.1 Wall Thickness:

These tanks are two layer with the minimum nominal wall thickness for the RILSAN® ROTO 11 layer of 1 millimeter and a minimum nominal overall tank thickness of 4 millimeters. The verification of the average wall thickness is obtained by taking the average of a minimum of six measurements of the wall thickness randomly taken over the entire surface of the tank. The measurements may be made by dissecting the tank and measuring the thickness with an optical comparator, vernier caliper or other similar device. The wall thickness may also be measured by suitable non-destructive methods.

2.2 Adhesion between the layers:

Arkema RILSAN® ROTO 11 Polyamide 11, PetroSeal™ PE, and Pebax® polyether block amide polymers are designed to work as a system and as such produce good adhesion between the layers over a broad spectrum of processing conditions

3.0 Rotomolding Process:

3.1 Materials & Molding Preparation:

- 3.1.1 RILSAN® ROTO 11 Polyamide 11 and PetroSeal™ PE are weighed out according to the design requirements of the tank to achieve the minimum average thicknesses that are mentioned earlier.

- 3.1.1.1 The outer material is added to the mold.

- 3.1.1.2 Pebax® Polyether Block Amide films are melt sealed on 3 sides to form a pouch/bag of appropriate volume to hold the specified volume of inner layer material. The use of several small Pebax® pouches is acceptable, and in fact preferred in many instances.

- 3.1.1.3 The Pebax® pouch/es is/are filled with the inner layer material, and melt sealed to form a completely closed sachet.

- 3.1.1.4 The filled pouch/es are placed in the mold on top of the outer material.

- 3.1.1.5 The mold is closed and the molding process can then occur.

3.1.2 Molding Process:

- 3.1.2.1 The mold is rotated on two axes in the oven at elevated temperature suitable for the outer material to stick and coalesce until a solid molten layer is formed.
- 3.1.2.2 After the outer material has completely melted and stuck to the mold, the temperature inside the mold reaches the melting point of the Pebax® bag material. As the bag melts, RILSAN® ROTO 11 powder is released into the mold.
- 3.1.2.3 When the inner layer has melted and fused, the mold is removed from the oven and rapid cooling begins.

3.1.3 Quenching the Mold:

- 3.1.3.1 While the mold is continuing to rotate, it is cooled for a minimum time such that the mold is cool enough to touch, further air-cooling or demolding can then occur.